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**Brandt**

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(54) **SYSTEM AND METHOD FOR  
COMPENSATING BINARY INLET BUFFERS  
DURING INLINE BUFFER DILUTION**

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See application file for complete search history.

(56) **References Cited**

**U.S. PATENT DOCUMENTS**

2003/0031086 A1 2/2003 Shikami et al.  
2005/0273203 A1 12/2005 Bellafiore et al.  
2012/0217192 A1 8/2012 Blank et al.  
2013/0081703 A1 4/2013 Andrei et al.  
2014/0340980 A1 11/2014 Brandt

**OTHER PUBLICATIONS**

International Search Report and Written Opinion from PCT Appli-  
cation No. PCT/US2016/018711 mailed May 2, 2016.

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**ABSTRACT**

Liquid blending systems and methods of blending liquids are provided. In particular, systems and methods for compensating binary inlet buffers during inline buffer dilution are provided. The systems and methods can provide blends of diluent, a first buffer concentrate containing a majority of a tempering component, and a second buffer concentrate containing a minority of a tempering component. The flow of the first buffer concentrate can be adjusted based upon the total amount of the tempering component being added to the blend through the first and second buffer concentrates.

**6 Claims, 3 Drawing Sheets**

